

AUL', inzh.; LOBOV, master; BORISOV, starshiy monter; SAFRONOV, V.I.

Concerning Tereshchenko's article "A fatal accident while climbing
a pole." Energetik 9 no.12:25-26 D '61. (MIRA 15:1)
(Electric lines--Poles) (Electricity, Injuries from)
(Electric lines--Safety measures)

SAFRONOV, V.I., tekhnik

Special safety belts for linemen. Energetik 10 no.1:25 Ja
'62. (MIRA 14:12)

(Safety belts)

SAFRONOV, V.I.

Warning markings on reinforced concrete power transmission line
poles. Energetik 11 no.6:23 Je '63. (MIRA 16:7)

(Electric lines—Safety regulations)

SARATOVTSOVA, R.G.; SAFRONOV, V.I.; DEKAPOLITOV, I.P. (Kiyev);
NAROZHNYI, V.B., inzh.; BERDICHEVSKIY, L.N., inzh. (Novosibirsk)

Concerning the article "Uniform safety engineering regulations
for electric power distribution networks." Energetik 13
no.11:33-34 N '65. (MIRA 18:11)

1. Starshiy inzh. PTE Kaliningradenergo (for Saratovtseva).
2. Nzhchal'nik sluzhby setey REU Kaliningradenergo (for Safronov).
3. Nachal'nik Darnitskogo setovogo rayona Yugo-Zapadnoy
zheleznoy dorogi (for Dekapolitov). 4. Kiyevenergo (for
Narozhnyy). 5. Priobskiy seti (for Berdichevskiy).

5 (4)

AUTHORS:

Kogan, V. B., Safronov, V. M.

SCV/76-33-6-28/44

TITLE:

A Method of Calculating the Equilibrium Between Liquid and Vapor in Three-component Systems II (Metod rascheta ravnovesiya mezhdru zhidkost'yu i parom v trekhkomponentnykh sistemakh. II)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 6, pp 1353-1359 (USSR)

ABSTRACT:

On the basis of results obtained in a previous paper (Ref 13), a graphoanalytical method of calculating the equilibrium between liquid and vapor of three-component systems from data of binary systems was worked out. The method is based on the following: To the same extent as the third component is added to the binary system, the coefficient of relative volatility changes decreasingly with the change in relative concentration of the components forming the binary system, and tends to a terminal value $X_3 = 1$ for which γ_1/γ_2 is constant (γ_1 and γ_2 = activity coefficients of the first and second components) and the maximum possible change of relative volatility of the first and second components (caused by the third component) is attained. By the data on the equilibrium of three binary

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A Method of Calculating the Equilibrium Between
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systems generated by the components of a ternary system, the position of the straight line can be determined which represents the activity coefficients of two arbitrary components as a function of the composition (at a concentration of the third component equal to zero or unity. By equation (1) (Ref 13), the function of the mean change in relative volatility on the concentration of the third component can be determined: $\lg(\gamma_1/\gamma_2)_{\text{mean}} = (Q_{13} - Q_{23}) / (1 - X_3)$. The change in relative volatility at any concentration of the third component can be regarded as a change which occurs at $X_3 = 1$. The method is illustrated by the system acetone-methanol-water. To check the method of calculating, it was also applied to the systems butane-butene-furfurol, isobutane-butene-furfurol, methanol-carbon tetrachloride-benzene, benzene-cyclohexane-isopropanol, acetone-chloroform-methylisobutylketone, heptane-methanol-toluene, methylethylketone-heptane-toluene. A comparative table of the vapor compositions calculated by the described method, and determined by experiment, of the systems acetone-methanol-water,

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A Method of Calculating the Equilibrium Between
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methanol-carbon tetrachloride-benzene, and methylethylketone-
heptane-toluene is given. There are 4 figures, 1 table, and
14 references, 4 of which are Soviet.

ASSOCIATION: Gosudarstvennyy institut prikladnoy khimii, Leningrad
(State Institute of Applied Chemistry, Leningrad)

SUBMITTED: November 30, 1957

Card 3/3

DENISOV, Ye.M.; SAFRONOV, V.N.

Bitumen equipment with water heating. Avt. dor. 19 no.6:
29 Je '56. (MLRA 9:9)

(Pavements, Bitumenous)

MOROZOV, S.A., kand. tekhn. nauk.; DENISOV, Ye.M., SAFRONOV, V.N.,
RITOV, M.N., kand. tekhn. nauk.; GRIBENKO, T.V., kand. tekhn. nauk.;
BELICHENKO, D.M., kand. tekhn. nauk.; ALEKSEYEV, A.P., red.;
MAL'KOVA, N.V., tekhn. red.

[Progressive practices in road organization] Peredovoi opyt v
dorozhnykh organizatsiyakh. Moskva, Nauchno-tekhn. izd-vo
avtotransp. lit-ry. No. 2. 1957. 35 p. (MIRA 11:11)

1. Moscow. Gosudarstvennyy Vsesoyuznyy dorozhnyy Nauchno-
issledovatel'skiy institut.
(Road construction)

BEITYAKOV, I.F.; GOLOVANOV, N.P.; SAFRONOV, V.P.

Stratigraphy of Sinian complex sediments in the Kotuykan basin.
Uch. zap. NIIGA. Reg. geol. no.4:60-72 '64. (MIRA 18:12)

SAFRONOV, V.P.

Finds of Mesozoic sediments in the northern Siberian Platform in
the upper Bol'shaya Romanikha Valley. Inform.biul.NIIGA no.14:9-13
'59. (MIRA 13:7)
(Bol'shaya Romanikha Valley (Siberian Platform)--Sediments (Geology))

SAFRONOV, V.P.

Time of the relief formation in the Kotuy-Maymecha interfluv.
Trudy NIIGA 121:130-131 '62. (MIRA 15:9)
(Kotuy Valley--Landforms) (Maymecha Valley--Landforms)

IVANOV, A.I.; SAFRONOV, V.P.

Contact-metasomatic changes in gabbro-dolerites, melilite rocks,
and iolite-melteigites of the Nemakit massif (right bank of the
Kotuya River). Trudy NIIGA 65:133-143 '59. (MIRA 13:12)
(Kotuy Valley--Metasomatism)

SMIRNOV, L.P.; SAFRONOV, V.P.

New finds of Mesozoic sediments in the Greater Romanikha Basin.
Inform. biul. NIIGA no.19:12-15 '60. (MIRA 13:12)
(Greater Romanikha Valley--Sediments (Geology))

SAFRONOV, V. S.

Safronov, V. S.

"Investigation of the effect of disorders in the normal operation of the fuel equipment on the thermal state of parts of an eddy-chamber diesel engine." Min Higher Education USSR. Moscow Inst of the Mechanization and Electrification of Agriculture imeni V. M. Molotov. Moscow, 1956. (Dissertation for the Degree of Candidate in Technical Sciences).

Knizhnaya letopis'
No. 21, 1956. Moscow.

SAFRONOV, V. S.

Mbr., Astronomical Council, Acad. Sci., -c1948-.

"Computing the Absorption of Light from Stars of
Various Temperatures." Astron. Zhur., 25, No. 6, 1948,

BR-52085091

SAFRONOV, V. S.

USSR/Astronomy - Cosmogony

Dec 51

"Conference on Cosmogony," V. S. Safronov

"Nauka i Zhizn'" Vol XVIII, No 12, pp 28, 29

Conference of Astr and Physicomath Sections of Acad Sci USSR was held in Moscow 16 - 19 April 51. Discussed was theory of Acad O. Yu. Schmidt, outlining original explanation of rotation and revolution of planets by energy loss of cong particles. Capitalistic theory of Jeans was denied in 1934 by N. N. Patiyskiy, Soviet scientist. Contributions were made by V. G. Fesenkov, N. D. Moiseyev, N. F. Reyn, and Acad V. A. Ambartsumyan.

209T1

SAFRONOV, V. S.

189T3

USSR/Astronomy - Visual Binaries May/Jun 51

"Statistics of Physical Characteristics of
Visual Binaries," V. S. Safronov, Geophys Inst,
Acad Sci USSR

"Astron Zhur" Vol XXVIII, No 3, pp 172-183

Safronov computes visual function of luminos-
ity by using Kuiper's tables of nearest stars
(cf. Sky and Telescope, VII, 4, 1948) and com-
piles table of av mass of stars of given
visual magnitude. Graphs showing the distri-
bution of binaries of various spectral classes
according to ΔM , M being the abs magnitude of
star.

189T3

SAFRONOV, V. S.

LC

18775

USSR/Astronomy - Sun

Jul/Aug 51

"Decrease of Angular Momentum of the Sun in Connection With Loss of Its Mass in the Process of Evolution," V. S. Safronov, Geophys Inst, Acad Sci USSR

"Astron Zhur" Vol XXVIII, No 4, pp 244-252

Attempts to find cosmogenic consequences from loss of mass by star, resulting from corpuscular radiation. For computation of angular momentum coefficient μ describing the deg of heterogeneity of star is

LC

18775

USSR/Astronomy - Sun (Contd)

Jul/Aug 51

essential. Dependence of μ on mass and angular velocity of star is still unknown. Safronov was assisted by criticism of B. Yu. Levin. Submitted 1950.

SAFRONOV, V.S.

"Decrease in the rotation moment of the sun in connection with
the diminution of its mass during the evolutionary process"
(author's abstract). Vop.kosm.1:276-278 '52. (MIRA 7:2)
(Sun--Rotation)

SAFRONOV, V. S.

USSR/Astronomy - Density of Matter Mar/Apr 52

"Density of Matter in the Galaxy in the Neighborhood of the Sun," V.S. Safronov, Geophy Inst, Acad Sci USSR

"Astron Zhur" Vol XXIX, No 2, pp 198-207

Subject problem is of great interest to cosmogony and stellar astronomy. Discusses detns of density according to Oort's method and author's method. Concludes that $3 \cdot 10^{-24}$ gram/ cu cm is the upper limit of the density of interstellar matter in the neighborhood of the Sun. Submitted 10 Sep 51.

216767 .

SAFRONOV, V. S.

226T47

Astrophysicist; Academicians P. P. Parenago,
G. A. Shajn, G. Fesenkov, astronomers; and Ya. P.
Terletskiy, theoretical physicist. Received
7 Jun 52.

226T47

From 19 to 22 May 52 a conference was held in
Moscow on stellar cosmogony, organized by the Dept
of Phys-Math Sci, Acad Sci USSR. More than 300 Sci-
entists attended. The most prominent among them
were: V. A. Ambartsumyan, Corr Mem, Acad Sci USSR,

"Astron Zhur" Vol 29, No 4, pp 498-505

"Conference on Problems of Stellar Cosmogony,"
V. S. Safronov

USSR/Astronomy - Cosmogony

Jul/Aug 52

SAFRONOV, V. S.

Jul/Aug 53

USSR/Astronomy - Conference

"Session Held by the Astronomical Council, Academy of Sciences USSR, and by the Institute of Physics and Astronomy, Academy of Sciences of Estonian SSR, in Tartu 27-29 May 1953," V. S. Safronov

Astr Zhur, Vol 30, No 4, pp 465-467

Session held 27-29 May 53 in Tartu was devoted to the dynamics of the galaxy. Brief reports were given by participants whose names follow: I. G. Eykhfel'd, pres, Acad Sci Est SSR; G. I. Naan, vice-pres, Acad Sci Est SSR; Acad G. A. Shayn; A. A. Mikhailov, M. F. Subbotin, and D. D. Maksutov, all Corr Mem, Acad Sci USSR and Active Mem Acad Sci Est SSR; Prof T. Ya. Rootsmayae; Prof A. N. Deych; Prof K. F. Ogorodnikov; and Prof S. K. Vsekhsvyatskiy.

262T31

USSR/Astronomy - Conferences Nov/Dec 53

"Conference of Commission in Cosmogony, Devoted to Physics of Nebulae and Interstellar Medium, held 8-12 Jul 1953 in Simeiz," V. Safronov

Astron Zhur, Vol 30, No 6, pp 675-677

Describes conference attended by 40 specialists. The session was inaugurated by Acad G.A. Shayn. The participants reported on progress in USSR and abroad. After the conference they visited the village Partizanskoye, where a new observatory is under construction.

273r81

USSR/Astronomy - Interstellar Matter

21 Apr 53

"Possible Source of Energy of Motion of Interstellar Matter," V. S. Safronov

DAN SSSR, Vol 89, No 6, pp 987-990

Concludes that subject motion results from: (1) transfer of gas and dust from high-pressure region to low; (2) action of direct pressure of light quanta on dust particles, neutral hydrogen atoms, and other elements (e. g., a cloud with 2.5-parsec radius, optical thickness $\tau = 0.3$, mass 10 Suns, containing 1% dust particles and located 15 parsecs from type -08 star acquires by action of only pressure of light on the particles a velocity of 1 km/sec in 3 million years); (3) and, possibly, galactic rotation. Thanks S. B. Pikel'ner (of Crimean Astro Observatory). Presented by Acad O. Yu. Schmidt, 27 Feb 53.

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SAFRONOV, Y. S.

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57-83
Safronov, V. S. O vozniknovenii i istochnike energii dvizheniia mezhdvezdnoi materii. [The possible source of energy of motion of interplanetary matter.] *Akademiia Nauk SSSR, Doklady*, 89(6):987-990, April 21, 1953. table, 11; refs., 3; eng. trans. in: the previous article (published in Transactions of the 2nd Conference on Cosmogony, Moscow, 1953) the author suggested a hypothesis of the source of energy of motion of interstellar matter. He assumed that the radiation of hot stars might be this source, and noticed that the energy radiated by the hot stars into space is 1-2 orders higher than the dissipating energy of the motion of interstellar matter clouds which is generated by their collisions; and also results from the extinction of turbulent motion inside these clouds. Present article gives the respective calculations explaining in detail the theoretical considerations on which the formulas are based. Effective and surface temperatures for various spectral classes of stars as well as coefficient depending on energy distribution in the spectrum are given in table. The highest probable amount of energy emitted by stars of hot spectral classes must be equal to about 0.01 erg/gr/sec. Optical density of the interstellar space in direction of low galactic latitudes is so great that ultraviolet radiation must be absorbed in full. The total amount of absorbed ultraviolet radiation for all directions is probably 1 of emitted energy. Subject headings:
1. Interstellar matter motion 2. Energy of motion. —N.T.Z.

KUKARKIN, B.V., doktor fiziko-matematicheskikh nauk, redaktor; PA-
RIYSKIY, N.N., kandidat fiziko-matematicheskikh nauk, redaktor;
BARANOV, V.I., doktor fiziko-matematicheskikh nauk, redaktor;
BELOUSOV, V.V., redaktor; LEVIN, B.Yu., kandidat fiziko-ma-
tematicheskikh nauk, redaktor. MASEVICH, A.G., kandidat fiziko-
matematicheskikh nauk, redaktor; SAFRONOV, V.S., kandidat fi-
ziko-matematicheskikh nauk, redaktor.

[Problems in cosmogony] Voprosy kosmogonii. Moskva, Izd-vo
Akademii nauk SSSR. Vol 2. 1954. 363 p. (MLRA 7:8)

1. Chlen-korrespondent AN SSSR (for Belousov) 2. Akademiya
nauk SSSR.
(Cosmogony)

SAFRONOV, V. S.

USSR/Astronomy

Card 1/1

Author : Safronov, V. S.

Title : Tasks and Perspectives of Astronomical Studies.

Periodical : Vest. AN SSSR, Ed. 2, 102-104, Feb/1954

Abstract : General information on the conference of an astronomical board of the Academy of Sciences of the USSR, in regards to the coordination of the scientific-observatory works of the All-Union Astronomical Institutes. The board adopted the directives for conducting of studies on major problems related to astronomy, cosmology, development of new observatory instruments and studies of the sun eclipse on 30 June 1954.

Institution :

Submitted :

SAFRONOV, V.S.

GP
CU
Interastral atmosphere. I. Distribution in space, movement, and physical properties of an interastral substance. V. S. Safronov. *Voprosy Kosmogonii, Moscow: Izdatel. Akad. Nauk S.S.R. Sbornik 2*, 275-310(1954); *Referat. Zhur., Astron. i Geodes.* 1955, No. 631. — This is a survey of works on interastral matter. The results of many observations are summarized; the basic properties of interastral atm. are described. The following questions are discussed: d. and mass of an interastral substance; clouds of an interastral substance; movement of interastral clouds; identity of gaseous and dust clouds; ionization areas of interastral gas; distribution of kinetic energy and temp. of interastral atm.; compn. and d. of interastral gas; size and compn. of interastral particles; light absorption in interastral space; polarization of light. Marjorie Ketner

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SAFRONOV, V.S.

"Orbit and mass of the dark satellite of double star 61 Cygni."
A.N.Deich. Abstract by V.S.Safronov. Vop.kosm. 2:323-324 '54.
(Satellites) (MIRA 8:5)

SAFRONOV, V.S.

"The size of interstellar clouds" [in English] Mac Grea. Abstract
by V.S.Safronov. Vop.kosm. 2:327 '54. (MIRA 8:5)
(Interstellar matter)

SAFRONOV V.S.

"On the number of large clouds of interstellar matter" [in French]
E.Schatzman. Abstract by V.S.Safronov. Vop.kosm. 2:328 '54.
(Interstellar matter) (MIRA 8:5)

SAFRONOV, V.S.

Conference on problems of stellar cosmogony. Vop.kosm. 2:335-336
'54. (Stars) (MLRA 8:5)

SAFRONOV, V.S.

Kinematics of subsystems of long-period Mira variables. Per.
zvezdy 10 no.4:236-252 D'54. (MLRA 8:12)
(Stars, Variable)

SAFRONOV, V.S.

Results and prospects of astronomical research (in the Astronomy Council
of the Academy of Sciences of the U.S.S.R.). Vest. AN SSSR 24 no.2:102-104
F '54. (MLRA 7:3)
(Astronomy)

SAFRONOV, V. S.

AID - P-241

Subject : USSR/Astronomy

Card : 1/1

Author : Safronov, V. S.

Title : Chronicle

Periodical : Astron. zhur., v. 31, 2, 213-215, Mr - Ap 1954

Abstract : The regular plenum meeting of the Astronomic Council of the Academy of Sciences of the USSR, was held on December 12-13, 1953 at Pulkovo, and was dedicated to the activity of the Council in 1953. On December 14-15, 1953 a conference on the coordination and planning of scientific research work in 1954 for all astronomical institutions in the USSR took place in Pulkovo. The fundamental problems are: cosmogony, study of the sun, astrometry, and celestial mechanics. Various committees made their reports.

Institution : None

Submitted : No date

SAFRONOV, V.S.

Growth of planets in a protoplanetary cloud. Astron.zhur. 31 no.6:
499-510 N-D '54. (MLBA 8:1)

1. Geofizicheskiy institut Akademii nauk SSSR.
(Planets)

SAFROMOV, V.S.

Light pressure on dust and gas in the vicinity of stars of different
types. Vop.kosm. 4:87-107 '55. (MIRA 9:4)
(Light) (Interstellar matter)

SAFONOV, V.S.

Conference of May 24-26, 1954 on the study of variable stars.
Vop.kosm.4:276. '55. (MIRA 9:4)
(Astronomy--Congresses)

SAFRONOV, V.S., kandidat fiziko-matematicheskikh nauk.

Density of matter in the region of the sun and the problem of star formation. Priroda 44 no.12:74-76 D '55. (MLRA 9:1)

1. Geofizicheskiy institut Akademii nauk SSSR.
(Stars) (Interstellar matter)

SAFRONOV, V.S.

Variation in the rotation of the sun as a result of fallout of matter
due to the Poynting-Robertson effect. Dokl.AN SSSR 105 no.6:1184-1187
D '55. (MIRA 9:4)

1.Geofizicheskiy institut Akademii nauk SSSR. Predstavleno akademikom
O.Yu.Shmidtom.
(Sun--Rotation)

SAFRONOV, V.S., kandidat fiziko-matematicheskikh nauk.

Plenum of the Astronomical Council. Vest.AN SSSR 26 no.4:135-136
Ap '56. (Astronomy) (MIRA 9:7)

SAFRONOV, V.S.

Plenary session for reports and coordination of the the Astronomical
Council of the Academy of Sciences of the USSR, February 6-9, 1956.
Astren.zhur.33 no.3:453-456 My-Je '56. (MIRA 9:10)
(Astronomy)

SAFRONOV, V.S.

✓12. THE POSSIBILITY OF TURBULENCE IN THE 523.11
PRIMARY PLANETARY CLOUD. V.S. Safronov and
E.I. Ruskol.
Dokl. Akad. Nauk SSSR, Vol. 108, No. 3, 413-16 (1950). In
Russian.

Criteria of stability of streamline flow between two cylinders are applied to the flow of the initial cloud about the sun. According to this test streamline flow should be stable. Assuming that the change of temperature in the cloud complies with the adiabatic law, the possibility of heat flow by convection is investigated. It is found that convection cannot arise. The authors conclude that the flow in the initial cloud was not turbulent.

R. Elsenschitz

SAFRONOV, V.S.

"On the Trubulence in the Protoplanetary Cloud," 7 p.
paper submitted at Third Symposium on Cosmical Gas Dynamics, Cambridge, (Mass.),
24 - 29 June 1957.

Trans. Available
B-3,101,248, 1 Apr 58

SOV/ 124 58-5-5548

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 88 (USSR)

AUTHORS: Safronov, V.S., Ruskol, Ye. L.

TITLE: On a Turbulence Hypothesis in a Protoplanetary Cloud (O
gipoteze turbulentnosti v protoplanetnom oblake)

PERIODICAL: V sb.: Vopr. kosmogonii. Vol 5. Moscow, AN SSSR, 1957,
pp 22-46

ABSTRACT: In paragraph 1 the stability of a laminar rotational motion in
a protoplanetary cloud relative to convection is investigated. A
corresponding stability condition is deduced which in the case
of moderate temperatures (heat velocities smaller than peri-
pheral velocities) is reduced to the well-known convective-
instability criterion

$$|dT/dn| > \gamma g/a_2 R$$

where a_2 is a constant of the order of unity and g is the gravi-
tational acceleration. This condition is known not to be fulfilled
in a protoplanetary cloud as a result of which the erroneousness
of Weizsäcker's cosmogonic hypothesis is deduced. If incipient

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SOV / 124-58-5-5548

On a Turbulence Hypothesis in a Protoplanetary Cloud

turbulence were present in a protoplanetary cloud, it would subside quickly. In paragraph 2 it is demonstrated that in a rotating turbulent protoplanetary cloud the tangential stresses depend on the gradient of the moment of the quantity of motion and not on the angular-velocity gradient as assumed by Weizsäcker, who had uncritically adapted the results obtained for the case of laminar motion to that of turbulent motion. It follows from the above that there is a tendency towards retention of the substance in the central part of the cloud and not a division of the substance into the outer portions moving away from the sun and the inner portions gravitating toward the sun, as was assumed by Weizsäcker. Paragraph 3 examines the process of the growth of the nuclei in the protoplanetary cloud. The growth of the nuclei does not prevent them from settling in the equatorial plane nor does it inhibit the increase in density to the critical point in the sense of gravitational instability. However, for this it is necessary for the relative velocities of the particles to be very small (of the order of 1 cm/sec in the vicinity of the Earth and 100 cm/sec in the vicinity of large planets). Bibliography: 19 references.

S. L. Kaplan

1. Interstellar matter--Turbulence
2. Turbulence--Theory
3. Particles--Theory

Card 2/2

SAPRONOV, V.S.

Professor H. Alven's lecture on the origin of the solar system.

Vop. kosm. 5:297-298 '57.

(MLRA 10:8)

(Solar system)

(Cosmogony)

AUTHOR: Safronov, V. S. 517

TITLE: Conference on the physics and the origin of planetary nebulae. (Saveshchaniye po fizike i proiskhozhdeniyu planetarnykh tumannostey).

PERIODICAL: "Astronomicheskiy Zhurnal" (Journal of Astronomy), 1957, Vol.34, No.2, pp. 310-311 (USSR).

ABSTRACT: This Conference took place on February 3-4, 1957, at the University of Leningrad. 75 persons took part. V. V. Sobolev gave a review paper on the contemporary state of the physics of planetary nebulae. A. Ya. Kipper and V. M. Tiit gave a paper on "Subdivision of light quanta and the relation of this process to the physics of gaseous nebulae". G. A. Gurzadyan devoted his paper to the dynamics of planetary nebulae. He noted that the most extended bipolar nebulae should be connected with the magnetic field. It is possible that bipolar structure is connected with the existence of a self-field of the nebula and different velocities of dispersion down and across the magnetic field. Gurzadyan considers that the planetary nebula is a remainder of a primary material from which the central nucleus-star was formed. Gradual heating up of the star leads to a gradual expansion of the shell and its final separation.

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Conference on the physics and the origin of planetary
nebulae. (Cont.)

A communication on "Theory of ionisation waves of shells of stars, in connection with the problem of the origin of planetary nebulae" was given by S. A. Kaplan (cf. this issue p.183). S. B. Pikel'ner and I. S. Shklovskiy discussed the nature of the spherical gaseous corona of the Galaxy. The authors criticised Spitzer's theory of the galactic corona. They consider that the motion of the gas is sustained by the waves propagated from the centre of the Galaxy. I. N. Minin noted the great role played by light pressure in the nebula on the order of the HII region. I. S. Shklovskiy gave a brief version of his work on planetary nebulae published in issue No.3, 1956, of the Stronomicheskii Zhurnal. B. A. Vorontsov-Vel'yaminov noted that in the majority of cases it is impossible to determine whether a given nebula is optically thin or optically thick. It follows that all scales of distances of planetary nebulae are subject to large systematic errors. P. P. Parenago pointed out that a good scale of distances of planetary nebulae does not as yet exist.

Recd. Feb. 19, 1957.

SAFRONOV, V.S.

33-3-32/32

AUTHOR: Safronov, V.S.

TITLE: Plenary session of the Astronomical Council of the Academy of Sciences of the USSR, devoted to reports and co-ordination. (Otchetno-koordinatsionnyy plenum astronomicheskogo Soveta Akademii Nauk SSSR)

PERIODICAL: "Astronomicheskii Zhurnal" (Journal of Astronomy), 1957, Vol. 34, No. 3, pp. 503-504 (U.S.S.R.)

ABSTRACT: A plenary session of the Astronomical Council of the Academy of Sciences of the USSR took place on February 5-7, 1957, in Pulkov. It was devoted to reports on the activities of the Council in 1956, and the plans for research in the various astronomy departments in the USSR.

During 1956, the most active committees were those devoted to the study of the sun and astrometry. Ten conferences were organised during 1956. A number of astronomers from abroad took part in these conferences. Soviet astronomers visited other countries and took part in the conferences there. Scientific contacts between Soviet astronomers and those of other countries were strengthened.

Prof. Kukarkin spoke on "International co-operation in astronomy". He pointed out that scientific contact and co-operation with astronomers abroad was of benefit to all. He suggested that while taking part in conferences abroad, Soviet

Card 1/2

SAFRONOV, V. S.,

"The Accumulation of Terrestrial Planets,"

paper presented at the IXth General Assembly of the IAU, Moscow, Aug 1958.

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SOV/169-59-3-2144

3.9000

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 3, p 12 (USSR)

AUTHOR: Safronov, V.S.

TITLE: On the Growth of ¹²Planets of the Earth's Group

PERIODICAL: V sb.: Vopr. kosmogonii, Vol 6, Moscow, AS USSR, 1958, pp 63-77
(Engl. Res.)

ABSTRACT: This is a discussion of the growth of planetary nuclei, caused by a simultaneous accumulation of small particles and larger bodies on their surface. Small particles are absorbed by larger bodies already in the early stage of their growth, if a crushing of the bodies does not occur. A cloud is changed to a "cluster", and the further process of nucleus growth consists in the accumulation of single bodies. The crushing of bodies during collisions prevents the complete absorption of particles by a cluster. A considerable part of the planetary matter must pass through repeated crushing and reunifications. The gaseous matter hardly participated in the growing process. The author takes into account the influence of the relative velocity of falling bodies on the earth's growth rate.

Card 1/2

AUTHOR: Safronov, V.S. 33-35-3-25/27

TITLE: Session of the Astronomical Council of the Academy of Sciences of the USSR and of the Academy of Sciences of the Azerbaydzhan SSR (Sessiya astronomicheskogo soveta Akademii nauk SSSR i akademii nauk Az SSR)

PERIODICAL: Astronomicheskii zhurnal, 1958, Vol 35, Nr 3, pp 506-507 (USSR)

ABSTRACT: The conference which was held from September 26 - 30, 1957 in Baku was devoted to the scientific problems of the Azerbaydzhanian Astrophysical Observatory which is being built and to the preparation for the 700 anniversary of the observatory in Maraga. The new observatory is erected on the Pirkuli Hill in northwestern direction, 20 km from ~~the~~ Shemakha. ~~town~~. The number of clear days and nights per annum amounts to 200-250. The best months are December and January. The project of the observatory is due to D.Kh. Yenikev and S.M. Vandov. At the moment there is only an astronomical observation station with a 200 mm meniscus telescope and a spectrograph on the Pirkuli Hill.

The observatory in Maraga : was founded in 1259 by Mukhammed Nasiredin Tusi.

Card 1/2

33-35-3-26/27

AUTHOR: Safronov, V.S.

TITLE:

Reporting and Coordinating General Meeting of the Astronomical Council of the Academy of Sciences of the USSR from February 5 - 7, 1958 (Otchetno-koordinatsionnyy plenum astronomicheskogo soveta Akademii nauk SSSR 5 - 7 fevralya 1958 g)

PERIODICAL:

Astronomicheskiy zhurnal, 1958, Vol 35 Nr 3, pp 508-509 (USSR)

ABSTRACT:

February 5 - 7, 1958 there took place a general meeting of the Astronomical Assembly of the USSR in Pulkovo. Participants: 1. Members of the Council 2. Head masters of the astronomical offices 3. The chairmen of the committees of the Council. The order of the day: 1. Report on the activity 1957 2. Coordination of the scientific activity of astronomical offices for 1958. A.A. Mikhaylov, Corresponding Member of the Academy of Sciences and Chairman of the Astronomical Council spoke about point 1. It was emphasized: The very intensive activity because of the sputnik experiments, the contact with foreign countries in observations of sputniks, agreement with Czechoslovakia, Roumania, Hungary, Yugoslavia, China and Mongolia on the performance of common observations of the sun. The astronomical meetings which took place in the USSR in 1957 and the international meetings visited by Soviet

Card 1/2

Reporting and Coordinating General Meeting of the Astronomical Council of the Academy of Sciences of the USSR from February 5 - 7, 1958 33-35-3-26/27

astronomers in 1957 were enumerated. Concerning point 2 it is mentioned that an intensification of the construction of astronomical instruments is commended to be urgently necessary. On February 7 A.G. Masevich spoke about the astronomical observations of the sputniks which were carried by 70 stations in the USSR. In the astronomical council, a team under the guidance of A.M. Lozinskiy elaborates the theory of method of the visual and photographic sputnik observations.

SUBMITTED: April 14, 1958

Card 2/2

AUTHOR: Safronov, V. S. SOV/49-59-1-16/23
TITLE: On the Initial Temperature of the Earth
(O pervonachal'noy temperature Zemli)
PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya,
1959, Nr 1, pp 139-143 (USSR)
ABSTRACT: There are two main hypotheses on the origin of the
Earth. One of them, developed by Shmidt (Ref 1),
Edgeworth (Ref 2), Gurevich and Lebedinskiy (Ref 3),
suggests that the Earth was formed by accretion of
solid particles and small bodies. On this hypothesis
the Earth was initially relatively cold. On the other
hypothesis (Fesenkov, Ref 4) the Earth was formed from
a very massive cloud consisting of gases of inter-
stellar dust. From a portion of such a cloud
protoplanets were formed. These protoplanets
contracted rapidly, lost their light gases and were
transformed into very hot planets. The protoplanetary
hypothesis meets, on closer analysis, with serious
difficulties. It is difficult to see how the original
Card 1/3 protocloud, and the protoplanetary cluster formed from

On the Initial Temperature of the Earth SOV/49-59-1-16/23

it, lost eventually most of their mass. The chemical composition of the Earth also contradicts the protoplanetary hypothesis, but it can be explained on the basis of the cold accretion hypothesis, as shown by Urey (Ref 9). The accretion hypothesis suggests that the Earth grew by attraction to its nucleus of solid particles and bodies from the protoplanetary cloud. The initial temperature of the Earth, i.e. the temperature at the end of the formation process, would be due to:

- 1) heating due to impact of the attracted particles and bodies,
- 2) radio-active heating of the growing nucleus,
- 3) heating of this nucleus by gradual compression due to the growing outer layers.

The author considers these three mechanisms of temperature rise and reviews the work already reported. He concludes that at the end of its formative period, estimated at 10^8 years, the temperature of the Earth's centre was about 1000°K . The heat came mainly from decay of radio-active elements and compression during

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On the Initial Temperature of the Earth

SOV/49-59-1-16/23

growth of the initial nucleus. Heating by impact of the attracted bodies made only a small contribution. Further heating of the Earth occurred again by radio-active decay. The radio-active content of the Earth could raise the temperature of the Earth's core by several thousand degrees in a period of 5×10^9 years. Such radio-active heating is important in all considerations of formation of the Earth and especially of its crust.

There are 2 figures and 17 references, 9 of which are Soviet, 7 English and one translation from English into Russian.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki Zemli
(Ac. Sc. USSR, Institute of Earth Physics)

SUBMITTED: July 13, 1957

Card 3/3

GOLUBCHIK, A.A.; SERGUNIN, K.G.; SAFRONOV, V.S.; KOROTYA, M.Ye.; GOL'DENBERG, S.Z.; SAVAT'YEV, M.I.; BANSHCHIKOV, N.P.

Unit for making 160mm multihollow reinforced concrete slabs. suggested by A.A.Golubchik, K.G.Sergunin, V.S. Safronov, M.K.Korotia, S.Z.Gol'denberg, M.I.Savat'iev, N.P.Banshchikov. Rats.i izobr. predl.v stroi. no.13:9-11 '59. (MIRA 13:6)

1. Po materialam Fryazinskogo stroitel'no-montazhnogo upravleniya stroitel'nogo tresta No.27 Mytishchistroy Glavmosoblstroya.
(Concrete slabs)

89065

S/555/60/007/000/003/007
B123/B201

3,1420 (1041, 1080, 1109)

AUTHOR: Safronov, V. S.

TITLE: Accumulation of terrestrial planets

PERIODICAL: Voprosy kosmogonii, v. 7, 1960, 59-65

TEXT: A quantitative investigation has been made of the process of accumulation. The very first state of the cloud of matter is assumed to have been sunlike and to have been followed by a separation into gas and dust, with the solid matter accumulating in the cloud's equatorial plane. Gravitational conditions have been thoroughly discussed by L. E. Gurevich and A. I. Lebedinsky (Izv. AN SSSR, Ser. Fiz., Vol. 14, p. 765, 1950). To attain Roche's density in the dust layer it is necessary for the velocity of the particles to not exceed a certain critical value. In an early stage of the cloud's evolution, a swarm of bodies probably rotated to an ever-increasing density, whereby also the gravitational interactions were intensified. The gaseous matter, however, was not essentially involved in the process of accumulation. In previous studies already, the author has been dealing with the problem of the accumulative growth of planetary embryos. Papers by

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S/555/60/007/000/003/007
B123/B201

Accumulation of terrestrial planets

O. Yu. Shmidt are also available on this subject (Dokl. AN SSSR, Vol. 46, p. 392, 1945). The growth rate of a planetary embryo of mass m has been found to be expressed by

$$\frac{dm}{dt} = \gamma \pi r_e^2 Q v = \frac{4\pi\gamma}{P} r_e^2 \sigma(t) \quad r_e = \text{effective radius of the planetary embryo,}$$

γ = probability of association in collisions, and P = time of revolution about the sun.

$\sigma(t) = \sigma_0 \left(1 - \frac{m}{Q}\right)$, where Q denotes the present mass of the planets; $v = \sqrt{G_m/2r}$, where the factors leading to a decrease of velocity are not taken into account. Results of calculations are given in the present periodical, Vol. 6, p. 63, 1958. Calculations made by Ye. A. Lyubimova (Izv. AN SSSR, Ser. Geofiz. No. 5, p. 416, 1955) are also reported; the temperature at the end of the growth of the Earth attained a maximum at the center - during 10^8 years it increased to 1000°K . Also the heating of the Jupiter surface is discussed; it probably exceeded 1000°K . This permits explaining the higher density of the inner Jupiter satellite. The problem regarding the disintegration of smaller bodies in collisions is also discussed. It is possible

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Accumulation of terrestrial planets

to distinguish two stages in the evolution of the swarm: in masses of the order of $10^{22}g$ disintegration, and over $10^{26}g$ evaporation with consequent condensation. If β is the probability of disintegration in the case of one collision, and $(1-\beta)$ the corresponding probability of association, then, on a growth of the mass of the body from m_0 to m , the portion p of the total mass which has undergone disintegration will be $p \approx 1 - (m_0/m)^\beta$. If, e.g., $\beta = 0.1$, $m_0 \approx 10^{22}g$, and $m_0/m = 10^{-5}$, then $p \approx 0.7$. Detailed studies of

chemical interactions have been conducted by A. A. Yavnel' (Astr. Zhurn. Vol. 34, p. 445, 1957). Valuable data can be also obtained from an analysis of planetary rotation. A body hitting a growing planet of mass m and radius r causes an increase of the moment of momentum of this planet by $\Delta K = \alpha r v \Delta m$, where Δm , v , and αr denote the mass, velocity, and distance from target of the hitting body. The mean value $\bar{\alpha}$ is small, but still different from zero, and consists of two components, one systematic and the other accidental. The latter component manifests itself in the inclination of the planetary equator to its orbital plane, while the systematic one shows in the planetary rotation. The growth process of the larger planets is complicated by the following factors: dissipation of matter from this zone, accretion of the gas by the more massive embryonal planets, the possible transition of

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B123/B201

Accumulation of terrestrial planets

part of the hydrogen into the solid state. A study of these problems is necessary for a quantitative examination of the process of accumulation of the larger planets. There are 14 references: 9 Soviet-bloc and 5 non-Soviet-bloc. ✓

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR
(Institute of Physics of the Earth imeni O. Yu. Shmidt,
Academy of Sciences USSR)

Card 4/4

SAFRONOV, V.S.

Formation and evolution of protoplanetary dust sheets. Vop.kosm.
7:121-141 '60. (MIRA 13:11)

(Cosmogony)

S/O30/60/000/011/015/026
B021/B056

AUTHOR: Safronov, V. S., Candidate of Physical and Mathematical Sciences

TITLE: The Fourth Symposium on the Dynamics of Cosmic Objects

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, No. 11, p. 109

TEXT: The fourth symposium on the dynamics of cosmic objects was convened jointly by the International Astronomic Society and the International Society for Theoretical and Applied Mechanics; it took place from August 18 to August 29, 1960 at Varenna (Italy), and dealt with the aerodynamic phenomena in the stellar atmosphere. Astronomers, mechanics, and physicists of 15 countries attended this symposium. The Soviet delegation consisted of A. B. Severnyy, V. D. Shafranov, and V. S. Safronov. The main aim of the symposium was to establish closer contact among scientists of various fields of science and to increase research work in boundary fields between astronomers, mechanics and physicists. In the reports made by astronomers, improved values of observations were dealt with and conclusions were drawn concerning the character of physical

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The Fourth Symposium on the Dynamics of
Cosmic Objects

S/030/60/000/011/015/026
B021/B056

processes in stellar atmospheres. The mechanics and physicists spoke about methods of solving similar tasks arising in aerodynamics as well as about the results of laboratory research work. During conference intervals private discussions were held for the purpose of clearing pending problems, and useful contacts were established.

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16(1) 3. 1570

67941

SOV/20-130-1-14/69

AUTHOR: Safronov, V.S.

TITLE: On the Gravitational Instability in Plane Rotating Systems With Axial Symmetry

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 1, pp 53-56 (USSR)

ABSTRACT: K.F. Ogorodnikov (Ref 3) underlined the physical irreality of systems which are infinitely expanded in the direction of the axis of rotation. It is the aim of the present paper to determine the critical density for a real plane rotating cloud. Like the authors of earlier papers, Safronov assumed that the cloud maintains its axial symmetry during the entire period and that therefore the disturbances are radial (ring-shaped).

The condition $4\pi G \rho > \frac{2\omega}{r} (\omega r^2)' + \frac{4\pi^2 c^2}{\lambda^2} + \frac{c^2}{4r^2}$ characterizes

the equilibrium of the forces acting on that element which has shifted through the disturbing wave in the radial direction by $\delta r = 1$ without change of the angular momentum with respect to the center of mass of the system. In transition from the system which is infinite with respect to z to finite systems only the term related to gravitation changes in the above

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SOV/20-130-1-14/69

On the Gravitational Instability in Plane
Rotating Systems With Axial Symmetry

inequality. In this case Poisson's equation does no longer hold, and it is more convenient to calculate δF_r directly.

The following expression is then obtained:

$$\delta F_r = G \int_{r_0-\lambda/4}^{r_0+\lambda/4} \int_{-h_0}^{+h_0} \int_0^{2\pi} \frac{\rho(r \cos \varphi - r_0) r dr dh d\varphi}{(r^2 + r_0^2 + h^2 - 2rr_0 \cos \varphi)^{3/2}}$$

Here, r denotes the distance from the axis of rotation, h the distance from the central plane of the cloud. Integration of this expression leads to elliptical integrals the evaluation of which is discussed step by step. The expression

$4\pi G \rho f(\xi) > \frac{2\omega^2}{r} (r^2)^2 + \frac{4\pi^2 c^2}{\lambda^2}$ is found for the condition of the gravitation-dependent instability the function $f(\xi)$ assuming the following values:

	0.2	2	4	6	8	10	14	20
$f(\xi)$	0.96	0.64	0.43	0.34	0.28	0.23	0.172	0.124

The correction for the critical density is therefore considerable and depends on the ratio between the wavelength of the

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On the Gravitational Instability in Plane
Rotating Systems With Axial Symmetry

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SOV/20-130-1-14/59

disturbance and the density of the layer. The author then determines the value of ρ for which the density necessary for the gravitation-dependent instability is very small. For this purpose a formula derived by Ye.L.Ruskol (Ref 6) is used. The critical density necessary for the gravitation-dependent instability is very small if the wavelength of the disturbance is eight times higher than the density of the cloud. The minimum value of the critical density $\rho = 2.1$ is more than six times higher than the value determined by N.Bel and E. Schatzmann. Thus, the conditions found here for the gravitation-dependent instability in the interstellar matter of the Galaxy are assumed more rigorously than has hitherto been done. There are 6 references, 3 of which are Soviet.

ASSOCIATION: Institut fiziki Zemli im. O.Yu. Shmidta Akademii nauk SSSR
(Institute of Physics of the Earth imeni O.Yu. Shmidt of the
Academy of Sciences of the USSR)

PRESENTED: August 31, 1959 by L.I.Sedov, Academician

SUBMITTED: August 14, 1959

Card 3/3

RUSKOL, Ye. L.; SAFRONOV, V.S.

Origin of rapidly rotating asteroids. Astron.zhur. 38 no.2:273-
277 May-Apr '61. (MIRA 14:4)

1. Institut fiziki Zemli AN SSSR.
(Planets, Minor)

SAFRONOV, V. S. and RUSKOL, E. L.

"The History of The Lunar Atmosphere and The Possibility of Presence
of the Ice and Organic Compounds on the Moon"

report presented at the 13th Intl. Astronautical Federation Congress (FAI)
Varna, Bulgaria, 23-29 Sep 1962

SAFRONOV, V.S.

Problem of the rotation of planets. Vop.kosm. 8:150-167 '62.
(MIRA 15:7)

(Planets, Theory of)

SAFRONOV, V.S.

Velocity dispersion in rotating systems of gravitating bodies
with inelastic collisions. Vop.kosm. 8:163-179 '62. (MIRA 15:7)
(Rotating bodies)

37353
S/035/62/039/002/007/014
E052/E314

3,1550

AUTHOR: Safronov, V.S.

TITLE: On the temperature of the dust component of the
protoplanetary cloud

PERIODICAL: Astronomicheskii zhurnal, v. 39, no. 2, 1962,
278 - 289

TEXT: It is pointed out that one of the earliest stages in the evolution of the protoplanetary gas-dust cloud is the separation of the dust component from the gas component. A thin dust layer, which is formed in the equatorial plane of the cloud, is thought to be responsible for the appearance of protoplanetary condensations and bodies which ultimately coalesce, should have an important effect on its chemical composition and mass. In view of this, the author reports an estimate of the temperature of an optically thick protoplanetary dust layer, heated by solar radiation incident upon it at glancing angles. The refractive index is assumed to be independent of the

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E032/E314

On the temperature

wavelength and the scattering of light by the particles is taken to be isotropic. The homogeneous half-thickness of the layer is assumed to be proportional to the distance from the Sun ($h = \beta R$). The linear dimensions of the Sun in the z direction are taken into account. The problem is divided into two parts, namely, determination of the temperature inside the dust layer for a given boundary temperature and determination of the boundary temperature itself. A table is reproduced giving the temperature of the layer for different values of β and it is shown that the temperature increases with β . The maximum heating of the layer is due to light scattered by the gas component of the cloud. The temperature of a black body inside the layer is found to be of the order of $30 - 35^\circ \text{K}$ at a distance corresponding to the distance of Jupiter from the Sun, while at a distance of Saturn the result is $15 - 18^\circ \text{K}$. It is concluded that the condensation

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On the temperature

S/033/62/039/002/007/014
E032/E314

of hydrogen on particles inside the layer is impossible at distances corresponding to those of Jupiter, Saturn and Uranus. Condensation of hydrogen at the distance of Neptune is considered to be unlikely.
There are 2 tables.

ASSOCIATION: Institut fiziki Zemli Akademii nauk SSSR
(Institute of Physics of the Earth of the
Academy of Sciences, USSR)

SUBMITTED: June 23, 1961

Card 3/3

SAFRONOV, V.S., starshiy nauchnyy sotrudnik

How much cosmic substance falls on the earth. Priroda 51 no.1:127-
128 Ja '62. (MIRA 15:1)

1. Institut fiziki Zemli AN SSSR.
(Cosmic dust)

S/020/62/147/001/009/022
B104/B102

AUTHOR:

Safronov, V. S.

TITLE:

Special case of the solution to the coagulation equation

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 64 - 67

TEXT: The coagulation equation

$$\frac{\partial n(m, t)}{\partial t} = \frac{1}{2} \int_0^m A(m', m-m') n(m', t) n(m-m', t) dm' - n(m, t) \int_0^\infty A(m, m') n(m', t) dm', \quad (1)$$

describes the formation of planets by the joining of bodies and particles of the hypothetic preplanetary cloud. Here $n(m, t)$ is the number of bodies per unit volume and per unit mass m , whilst $A(m, m')$ is the coagulation factor depending on the masses m and m' of the colliding bodies. The classical solution to this equation was given by M. Smolukhovskiy (Sborn. Brounovskoye dvizheniye - The Brownian motion, 1936, p. 332, Sborn.

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Card :

$$\dots = \frac{N_0}{M} \varphi(t), \quad (3)$$

$$\dots, 0) dm, \quad M = \int_0^\infty m n(m, t) dm = \text{const.} \quad (4)$$

$$\dots = \text{const.} \quad (5)$$

S/020/62/147/001/009/022
B104/B102

Special case of the solution to...

where (1') takes on the form

$$\frac{1}{A_1 \varphi(t)} \frac{\partial G}{\partial t} = \frac{m}{2} \int_0^m g(m-m', t) g(m', t) dm'. \quad (6).$$

In addition, the variable

$$d\tau = M A_1 \varphi(t) dt, \quad \tau = 1 - e^{-A_1 M t}. \quad (7)$$

is introduced. Use of the Laplace transform

$$G(p, \tau) = \int_0^\infty e^{-p m} g(m, \tau) dm \quad (8)$$

gives the quasilinear equation

$$M \frac{\partial G}{\partial \tau} + G \frac{\partial G}{\partial p} = 0. \quad (9).$$

The solution is

$$G(p, \tau) = \int_0^\infty e^{-(M p - \tau G(p, \tau) + N_0) m / M} n(m, 0) dm. \quad (11).$$

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B104/B102

Special case of the solution to...

Only in a few cases can $G(p, \tau)$ be given explicitly. With an initial distribution $n(m, 0) = am^{-q} \exp(-bm)$ the author considers only the case $q = 0$, i.e. the initial distribution

$$n(m, 0) = ae^{-bm}, \quad (14)$$

$$a = N_0^2/M = N_0/m_0, \quad b = N_0/M = 1/m_0, \quad (15)$$

which has the solution

$$G(p, \tau) = \frac{M}{2\tau} \left[p + 2b - \sqrt{(p + 2b)^2 - 4b^2\tau} \right]. \quad (18)$$

This solution gives the mass distribution functions

$$n(m, \tau) dm \approx N_0 (1 - \tau) e^{-(1+\tau)m/m_0} \frac{dm}{m_0} \quad (23)$$

for $2m\sqrt{\tau} \ll m_0$ and

$$n(m, \tau) dm \approx \frac{N_0(1-\tau)}{2\sqrt{\pi\tau}^{1/2}} \left(\frac{m}{m_0} \right)^{-1/2} e^{-(1-\sqrt{\tau})^2 m/m_0} \frac{dm}{m_0}. \quad (24)$$

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Special case of the solution to...

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B104/B102

for $2m\sqrt{r} \gg m_0$. m_0 is the mean initial mass of the bodies. (24) can be used for the largest range of values of m and r . At this stage the large bodies make up much of the mass in the system, and the relative mass of the large bodies increases with time. Furthermore it is concluded that at the last stage in the evolution of the earth the major part of the mass consisted of large bodies.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR
(Institute of Physics of the Earth imeni O. Yu. Shmidt of
the Academy of Sciences USSR) ✓

PRESENTED: April 26, 1962, by V. A. Ambartsumyan, Academician

SUBMITTED: April 21, 1962

Card 5/5

SAFRONOV, V.S., RUSKOL, YE.L.

Atmosphere of the Moon.

Reports of the following Soviet Scientists were presented at the
XIIIth International Congress on Astronautics in Varna, Bulgaria,

P: Tekhnika Molodezhi, #1, 1963, pp. 24-25

ACCESSION NR: AP3000265

P/0048/63/000/001/0001/0004

AUTHOR: Safronov, V. S.; Rouskol, E. L.

TITLE: History of lunar atmosphere and the probability of occurrence of ice and organic compounds on the moon

SOURCE: Astronautyka, no. 1, 1963, 1-4

TOPIC TAGS: lunar atmosphere; O; CO; N sub 2; H sub 2; meteoric impact; vapor traps

ABSTRACT: In connection with the planned exploration of the moon's surface it became necessary to know whether various volatile substances and vapors liberated from the moon's surface may be retained as frozen substances on that part of the moon's surface which is not exposed to solar radiation. This problem is connected with the origin of the moon. It is assumed that the original lunar atmosphere consisted mostly of water vapors and CO sub 2. During the many years of

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ACCESSION NR: AP3000265

the moon's formation, perhaps as many as 3 billion years, practically the entire atmosphere disappeared into space, and the moon's interior became practically degasified. Using Jeans's reasoning, the authors determine how far the lunar atmosphere extends, and construct a model of this atmosphere giving its limits, probable density escape and speed of dissipation. In a table the probable composition and density of the lunar atmosphere are given at temperatures of 400, 600, and 1,000K. There are probably traps, formed during the past million years, where certain amounts of gases have been retained and frozen. These traps are very small, and ice evaporates from them very slowly. Meteoric impacts may probably liberate some frozen water vapors. [Abstracter's note: As presented in the cited source, this art. is actually a condensed abstract (prepared by Andrzej Marks) of the orig. art. by Safronov and Rouskol. There is no indication where the orig. art. appeared.] Art. contains 1 table, 7 equations.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 10Jun63

ENCL: 00

SUB CODE: 00

NR REF SOV: 000

OTHER: 013

Card 2/2

S/2555/63/009/000/0188/0195

ACCESSION NR: AT4019692

AUTHOR: Safronov, V. S.

TITLE: Characteristics of rotating systems. The "initial" density of the Metagalaxy

SOURCE: AN SSSR. Astronomicheskii sovet. Voprosy kosmogonii (Problems of cosmogony), v. 9, 1963, 188-195

TOPIC TAGS: astronomy, astrophysics, Metagalaxy, gravitational instability, protoplanetary cloud, cosmology, Galaxy, magnetic field, gas nebula, universe

ABSTRACT: The theory of gravitational instability as applied to rotating systems, the Galaxy and a protoplanetary cloud, is discussed. It is argued that the expansion of the Metagalaxy originates not from a point, but from a region of finite dimensions with finite density. The contributions made by Jeans, Gurevich, Lebedinskiy, Chandrasekhar, Bel, Schatzman and Safronov to the solution of this problem are reviewed. The author contends that application of the theory of gravitational instability to the Galaxy as a whole has shown that individual stars could not be formed by this process. Gravitational instability can lead to the formation of considerably larger condensations with a cross section of the order of the width of spiral arms. The actual picture is complicated by many factors,

Cord 1/3

ACCESSION NR: AT4019692

of which magnetic fields are one of the most important. The idea of formation of stars in groups, illustrated by the case of stellar associations, is in full agreement with the conclusions which can be drawn on the basis of the concepts of gravitational instability in the Galaxy. The application of the gravitational instability theory to a cloud rotating around the sun has shown that the critical density could not be attained in the gas component of the cloud, but it could develop in the dust component. This could lead to the formation of a large number of dust condensations with masses of the order of 10^{-7} - 10^{-10} planetary masses. The Jeans theory of gravitational instability in an infinite homogeneous medium encounters difficulties which do not appear when instability is considered in real rotating systems of finite dimensions. The importance of the rotation factor in cosmology is stressed, since this factor is often neglected in cosmological models. The paucity of knowledge concerning the past and future of the Metagalaxy is discussed. The author considers the concept of the compression (or expansion) of the entire infinite universe toward a single center, and the rotation of an infinite universe as a single entity to be quite artificial; it would be more correct to speak of compression and rotation of finite parts of the universe. It is shown that models with a maximum density substantially less than nuclear and with a state of matter determined by their prehistory merit attention, especially those involving collisions and destruction of a considerable number of stars, making it improbable that the expansion of the universe was completely uniform and isotropic. "The

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ACCESSION NR: AT4019692

author expresses thanks to I. D. Novikov for useful discussions". Orig. art. has:
5 formulas.

ASSOCIATION: ASTRONOMICHESKIY SOVET AN SSSR (Astronomical Council, AN SSSR)

SUBMITTED: 00Nov62

DATE ACQ: 12Mar64

ENCL: 00

SUB CODE: AS

NO REF SOV: 007

OTHER: .002

Card 3/3

LEVIN, B.Yu.; SAFRONOV, V.S.

Comments on D.D. Ivanenko and M.U. Sagitov's article "On the hypothesis of the expansion of the earth." Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.4:84-85 J1-Ag '63. (MIRA 16:8)

1. Institut fiziki Zemli AN SSSR imeni O.Yu. Shmidta.
(Cosmology)

ACCESSION NR: AT4019694

S/2555/63/009/000/0203/0214

AUTHOR: Safonov, V. S.; Buskel, Ye.L.

TITLE: History of the lunar atmosphere and the possibility of existence of ice and organic compounds on the moon

SOURCE: AN SSSR. Astronomicheskii sovet. Voprosy* kosmogenii (Problems of cosmogony), v. 9, 1963, 203-214

TOPIC TAGS: astronomy, moon, lunar atmosphere, lunar ice, lunar radioactivity, lunar interior, lunar surface, lunar evolution, lunar crater

ABSTRACT: The maximum density and probable composition of the ancient lunar atmosphere are considered. It is assumed that the moon was formed as a cold solid body, with a relative abundance of volatile substances similar to that of the earth. The total quantity of released volatiles is placed at 100 kg H₂O, 5 kg CO₂ and 0.23 kg N₂ per square centimeter of the lunar surface. On the basis of data on the thermal history of the moon, heated by radioactive elements, it is postulated that the period of intense degassing of its interior coincided with the period of its melting (about 2.5-3·10⁹ years ago) and lasted about 10⁹ years. During the accumulation of the atmosphere its escape rate increased and when the degassing attenuated atmospheric density decreased to its present value. The

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maximum density near the surface is determined from the equality of the escaping flux to the flux from the interior during the period of active degassing and is found to equal 10^{-8} to 10^{-9} of that of the present-day terrestrial atmosphere. This corresponds to a density at heights of about 150 km above the earth's surface. The most abundant components of the lunar atmosphere, H_2O and CO_2 , therefore were dissociated mainly into O and CO . Liquid water probably never existed on the lunar surface because the density of water vapor was always much lower than saturation density. The presence of methane in the lunar atmosphere probably was impossible because methane is unstable in the presence of free oxygen. The authors disagree with the conclusions drawn by Watson, Murray and Brown that permanently shaded craters in the polar regions or "cold traps" were of great importance in the process of redistribution and conservation of H_2O on the moon or on their role as indicators of ancient activity of the lunar interior. The volume of these "traps" would permit lunar retention of not more than 10^{-3} of the total amount of released water. The suggestions made by C. Sagan also must be revised. Sagan concluded that certain complex organic compounds of the amino acid type can exist in the lunar soil in considerable quantity. His statement is based on the assumption that in the past the moon had a very dense atmosphere containing methane, ammonia and other gases in which organic synthesis was possible. The rarefaction of the lunar atmosphere, the predominance of photodiss-

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ACCESSION NR: AT4019694

ciation processes over synthesis processes and the absence of the necessary mixture of gases were in fact unfavorable for the formation of complex organic substances on the moon. "The author thanks Doctor of Physical and Mathematical Sciences B. Yu. Levin for useful discussion of this paper". Orig. art. has: 9 formulas and 1 table.

ASSOCIATION: Astronemicheskiy sovet AN SSSR (Astronomical Council)

SUBMITTED: 28Aug62

DATE ACQ: 12Mar64

ENCL: 00

SUB CODE: AS

NO REF SOV: 003

OTHER: 010

Card 3/3

SAFRONOV, V.S.

Gravitational instability and the development of perturbations. Vop.
kosm. 10:181-191 '64. (MIRA 17:10)

ZONENSHAYN, L.P.; BIRTEL'S-USPENSKAYA, I.A.; SAFRONOV, V.S.; NEYMAN, V.B.;
GENDLER, V.Ye.; CHURIKOV, V.S.; YEREMIN, N.I.; KOGAN, B.S.; YAKOVLEVA,
M.N.; LANGE, O.K.; KABANOV, G.K.; KUZNETSOVA, K.I.; SINITSYNA, I.N.;
SMIRNOVA, T.N.; VENKATACHALAPATI, V.; MASLAKOVA, N.I.; BELOUSOVA, Z.D.;
YAKUBOVSKAYA, T.A.; YURINA, A.I.; RYBAKOVA, N.O.; MOROZOVA, V.G.;
BARASH, M.S.; FONAREV, V.I.; NIKONOV, A.A.

Activity of the Geological Sections of the Moscow Naturalists'
Society. Biul. MOIP. Otd. geol. 39 no.6:127-151 N-D '64.
(MIRA 18:3)

L 60149-65 ENT(1) GW

ACCESSION NR: AP5018880

UR/0387/65/000/007/0001/0008
550.311

AUTHOR: Safronov, V. S. 44

TITLE: Primary inhomogeneities in the earth's mantle ^{12/44}

SOURCE: AN SSSR. Izvestiya. Fiziki zemli, no. 7, 1965, 1-8

TOPIC TAGS: earth crust, geophysics

ABSTRACT: A study of the process of accumulation of the earth from solid bodies and particles by methods of the theory of coagulation leads to the conclusion that a significant part of the mass of accumulated substance was concentrated in large bodies. Large bodies falling on the earth with randomly oriented velocities caused deviation from "direct rotation." From the angle of inclination of the equator to the ecliptic, it is found that the mass of the largest bodies which have fallen on the earth were on the order of 1/1,000 the mass of the earth, i.e., about 1,000 kilometers in diameter. Small differences in density and composition of the large bodies could lead to appreciable inhomogeneities in the earth's mantle. The falling of bodies with diameters of hundreds of kilometers was accompanied by heating of

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I 60149-65

ACCESSION NR: AP5018880

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wide regions in the zone of impact causing significant thermal inhomogeneities in the mantle, which could have been preserved over a billion years or more, and afterwards could be maintained in the upper mantle by the dissipation of energy in lunar tides. The possibility of long duration of excessively heated regions in the upper mantle with dimensions of several thousand kilometers gives a basis for explaining the differences between the continents and oceans. Orig. art. has: 11 formulas, 1 table.

ASSOCIATION: Institut fiziki zemli, Akademii nauk SSSR (Institute of Physics of the Earth, Academy of Sciences, SSSR) 44

SUBMITTED: 30Sep64

ENCL: 00

SUB CODE: ES

NO REF SOV: 012

OTHER: 013

dm
Card 2/2

L 14965-66 EWT(1) GW

ACC NR: AP6002692

SOURCE CODE: UR/0033/65/042/006/1270/1276

AUTHOR: Safronov, V. S.

ORG: Institute of Geophysics (Institut fiziki Zemli)

TITLE: Dimensions of the largest bodies that fell on planets during their formation

SOURCE: Astronomicheskiy zhurnal, v. 42, no. 6, 1965, 1270-1276

TOPIC TAGS: earth planet, Mars planet, Jupiter planet, Saturn planet, Uranus planet, Neptune planet, coagulation, distribution function, rotation

ABSTRACT: Relations linking the random component of angular momentum with mass are found for the largest bodies m_1 falling on a planet of mass m . An exponential distribution function of the sizes of the bodies is assumed. The formula

$$\frac{m_1}{m} = \frac{3-q}{2-q} \frac{10}{3(1+1/20)} \left(\frac{8\mu \sin s}{5\pi} \frac{v_r}{v_c} \right)^2$$

is used to calculate the masses of the largest bodies that have fallen on the earth, Mars, Jupiter, Saturn, Uranus, and Neptune, the values of which are tabulated. The results show that the masses of the largest bodies can be determined with sufficient certainty despite the absence of conclusive data on their size distribution function. Orig. art. has: 24 formulas and 1 table.

SUB CODE: 03/ SUBM DATE: 25Mar65/ ORIG REF: 005/ OTH REF: 005 UDC: 523.22
Card 1/1

L 02446-67 EWT(1) GW

ACC NR: AP6028795

SOURCE CODE: UR/0033/66/043/004/0817/0828

AUTHOR: Safronov, V. S.

ORG: Institute of Physics of the Earth, Academy of Sciences, SSSR (Institut fiziki Zemli Akademii nauk SSSR)

TITLE: The protoplanetary cloud and its evolution

SOURCE: Astronomicheskii zhurnal, v. 43, no. 4, 1966, 817-828

TOPIC TAGS: protoplanetary cloud, Hoyles hypothesis, solar system, PLANETARY ATMOSPHERE, ATMOSPHERIC CLOUD

ABSTRACT: Present-day ideas of the origin and evolution of the protoplanetary cloud are critically reviewed. Calculations are made which indicate that the main difficulty of Hoyle's hypothesis is that the solid particles in the disk which were separated from the central condensation do not move outwards together with the gas, but, on the contrary, "spiral" inwards and cannot spread throughout the solar system. Estimates of the mass and temperature of the protoplanetary cloud are discussed, and considerations are given in favor of its initial mass being of the order of 0.05 M.. [CS]
Orig. art. has: 6 formulas and 1 table.

SUB CODE: 03⁰⁴ SUBM DATE: 11Jan66/ ORIG REF: 019/ OTH REF: 014

Card

1/1

UDC: 523.12

SAPUNOV, Petr Yegorovich, zven'yevoj, Geroy Sotsialisticheskogo Truda.
Prinimali uchastiye: FEDIN, M.A.; SALOMAKHIN, I.I.; SAFRONOV,
V.V.; SHELEMENTSEV, I.T. CHELYSHKIN, Yu.G., red.; SERGEYEV,
V.I., red.; SOKOLOVA, N.N., tekhn.red.

[Sixty-two centners of corn per hectare] 62 tsentnera zerna
kukuruzu s gektara. Moskva, Izd-vo sel'khoz.lit-ry, zhurnalov
i plakatov, 1962. 77 p. (MIRA 15:4)

1. Kolkhoz "Krasnoye znanya" Dmitrovskogo rayona Orlovskoy
oblasti (for Sapunov).
(Dmitrov District--Con (Maize))

KOLPAKOV, L.G.; SAFRONOV, V.Ya.; LOPATIN, G.K.; FEDOROV, T.A.; YERONEN, V.I.

Possibility of using glandless pumps for pipelines. Trudy NIITrans-
neft' no.3:107-113 '64. (MIRA 18:2)